REMARKS

Reconsideration of the above-identified application, as amended, is respectfully requested.

In the Official Action, the Examiner rejected Claims 1-24 under 35 U.S.C. 103(a) as being unpatentable over Chundi et al. (U.S. Patent No. 6,502,091) ("Chundi").

Applicants respectfully disagree.

The present invention as claimed in Claims 1, 10 and 19 is generally directed to a classifier device (and method and program instructions executable by machine) for a customer self service system that performs resource search and selection, the system including a context attribute database comprising types of user contexts and one or more context attributes associated with each user context for processing by said system, and context attribute function database comprising functions for computing values for each context attribute, the classifier comprising a mechanism for receiving a user query and a context vector comprising data associating an interaction state with said user and including context that is a function of the user, processing said query and context vector against data included in said context attribute database and context attribute function database for predicting a particular user context. As a result of this processing, the system predicts a particular user context and populates the user context vector with context parameters specifying for use in a subsequent resource search. Thus there is provided the ability to relieve the user of the nonproductive work of describing their context and the ability to improve the search value by including criteria derived from both data and behaviors in the general population which may be unknown to the user.

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

Key to the invention is the implementation of a context vector comprising data associating an interaction state with said user and including context that is a function of the user. With respect to specific rejected elements of Claims 1 and 10 and 19, as will be explained in greater detail herein, the present invention is patentably distinct from Chundi in the respect that: a) user context data is used throughout a closed loop system; b) the context classifier functions address a much more complex set of user needs and resource types; and, c) the user context vector is combined with a user query for each transaction. To clarify this, Claims 1, 10 and 19 are being amended herein to set forth that the user context vector comprises not only data associating an interaction state with the user, but also includes context that is a function of the user.

The Examiner is respectfully referred to the passage in the present specification at page 10 lines 22-26, to wit:

> According to the invention, the term "context" includes a very broad range of "attribute-value pairs" which describe a user, including, but not limited to, their knowledge of a customer service domain, their organizational and community contexts, their user environments (including technology capabilities) and other items of static, historical or transient nature.

Respectfully, Chundi does not teach user context as is used in the present invention and claimed whereby a user context vector comprises data associating an interaction state with said user and including context that is a function of the user. As Chundi doesn't teach user contexts, he can't teach a context attribute database or a context attribute function database.

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

While the Examiner appears to equate Chundi's usage categories as context attributes in the sense of the present invention, applicants respectfully disagree. Chundi's usage categories are document categories. See Chundi at col. 7, lines 30-36 where he states: "In this section, a technique is described for making use of context groups that are discovered from the usage logs. Context groups and query contexts capture the associations among keywords and also with documents accessed by users and are therefore used to compute relevant document categories." (See Chundi at col. 7, lines 57-65) "A multiple, or multi-level DAG captures the context associated with documents, from most general to most specific. The most general context associated with a document may be referred to as a 'category.' A query context is the most specific content, and hence, query context nodes usually have a smaller set of documents associated with them. As the scope of query contexts is expanded by createing general context nodes, the number of documents may potentially increase."

Further with respect to the rejection of Claims 1, 10 and 19 that Chundi allegedly teaches the steps/elements of: receiving a user query (Chundi at col. 2, lines 31-49, col. 5, lines 5-16) and a context vector (FIG. 4; FIG. 5, FIG. 6, col. 7, lines 1-27) comprising data associating an interaction state with the user; and b) processing the query and context vector against data included in the context attribute database (36, FIG. 1); and, c) processing the query and context vector against data included in a context attribute function database (FIG. 4, FIG. 5, FIG. 6, col. 7, lines 1-27) comprising functions for computing values for each context attribute, wherein the processing steps b) and c) results in predicting a particular user context and populating the user context vector with context parameters specifying a user interaction state (usage logs, col. 2, lines 27-61), applicants respectfully disagree.

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

Chundi does teach receiving a user query, nor the use of user of context vectors, but rather teaches at col. 7, lines 16-17) "one vector for each query context." In amended Claims 1, 10 and 19, the present invention sets forth a user context vector comprising data associating an interaction state with said user and including context that is a function of the user.

Furthermore, the Usage logs (Chundi element 36 in Figure 1) cited by the Examiner are not the same as a context attribute database comprising types of user contexts and context attributes. As mentioned herein, in the current invention, context attributes are defined as (see page 17 lines 27-28) "An attribute is used to describe a characteristic associated with the User Context".

Particularly, Chundi is trying to solve the word mismatch problem in text retrieval whereby people often use a different query term with the same objective in mind, or even use the same query term with a different objective, as shown by the documents they ultimately open. As such, Chundi is trying to improve the intelligence of a text retrieval engine without using the expensive and often ineffective techniques of stemming, automatically generated thesauri.

More particularly, one difference between Chundi's system and the system of the invention, is that the present invention includes a user context vector associated with the current query and which comprises data associating an interaction state with the user. Chundi simply does not teach this. Chundi's use of context groups relates solely to query contexts (see Chundi at Col. 4, lines 44-52). Chundi seeks to discover query contexts, then merges them with clustering techniques and eventually rolls them up into document categories (see

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

Chundi at Col. 7, lines 30-36). For Chundi, a query context is a set of all the queries that yield a number of common user selected documents from those presented (see Col. 6, lines 17-24.), or all the document sets yielded from a common query. Chundi, at best, implies that his contexts reveal the intentions of the user but does not identify user contexts explicitly in the sense of the current invention as claimed in the present invention. For example, while Chundi states at Col. 8, lines 21-24:

> Finally, the most important advantage of the log relationship is that it tries to capture the user's intent and vocabulary by analyzing his/her behavior through the logs..

to the extent that the user's intent is all about content, this is similar to the present invention. However, because the system of the present invention provides a rich user context vector at query entry time, and because the system of the present invention captures that rich user context data in interaction records, the present invention can identify resources that are more or less useful to the user based upon criteria beyond content, (such as cost, length of time, currency, popularity of resource to others, ability to access the resource from many user environments, etc). This difference is especially important, and novel, and provides value, where resources are not a homogenous set of documents, but a mixed set of differing products or differing formats.

The big difference between Chundi contexts and contexts of the present invention is what they are a function of. Chundi assumes (and makes very explicit in the section referenced) that contexts are a function of the query words used during the current session. The present invention, on the other hand, focuses on contexts that are a function of the user, properties known about the user (like whether they are a manager, they are technical,

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

and which user interface context buttons they have pressed like "I am in class Java programming'). The present invention also considers contexts like the bandwidth of the connection to the user. None of these contexts of the present invention are a function of the query.

Furthermore, the query in Chundi's system does not come with any context information that is a function of the user. The conversion of query contexts into vectors in Chundi's system is a separate, (offline) process for the purpose of preparing document categories for presentation to the user. There is nothing in Chundi's invention which involves receiving a user context vector associated with the current user query and interaction state since the user in Chundi's system does not get to select from a user context when making their query. It appears that Chundi's process, which is offline, may not even be executed for each query.

In sum, Chundi's contexts are a function of the current query session alone, they do not have a notion of a user, so it is not possible to have user related context. They also do not have connection related context as in the present invention.

Finally, although the Examiner acknowledges that Chundi does not disclose populating a user context vector for use in a subsequent resource search, the Examiner asserts that it would have been obvious a person having ordinary skill in the art at the time the invention made to include a subsequent resource search in the system of Chundi by using and analyzing query logs for subsequent search purposes. In order to achieve high retrieval effectiveness, grouping (classifying) the contexts (groups of related words and meaning) by

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

analyzing the user's query logs is used to give the user high precision search results (subsequent resource search).

Respectfully, Chundi teaches an approach that assumes query logs generated by anonymous users. This is an advantage that makes their patent orthogonal to the present invention along the user context dimension. Their "user" contexts are limited to information that can be gleaned from a single transaction history with an anonymous user. Unlike the approach of the present invention, they have no separate user centric database where user properties may be stored. Indeed they have no mechanism for identifying which user is associated with a session. This is an advantage for them in that they do not require user authentication/identification. However, they do not even have a mechanism for accepting user specific parameters (user context such as: course membership, or manager status, for example). Because of this, it is not possible for them to learn context terms depending on such terms. Further their approach would need to lose its ability to address anonymous logs, and would require additional data sources to be able to address this class of users contexts.

In view of the foregoing reasons, applicants respectfully request withdrawal of the rejections of Claims 1, 10 and 19 under 35 U.S.C. §103(a).

With particular regard to the rejection of Claims 2, 11 and 20, the subject matter of these respective claims is directed to the mechanism for applying the context attribute functions to annotate the context vector. Particularly Claims 2, 11 and 20 have been amended to set forth the user context vector including context that is a function of the user. Respectfully, Chundi teaches a graph based (rather than supervised induction method) of associating queries to documents. Chundi additionally discusses a data mining system (see

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

Claims 21 and 22 of Chundi), but seems to be referring to the context clustering. Query association is additionally discussed where some kind of graph analysis is performed. Respectfully, this does not teach or suggest the mechanism for applying the context attribute functions to annotate the user context vector.

With respect to the rejection of Claims 3, 12 and 21, the subject matter of these respective claims is directed to the use of an inductive (supervised) learning algorithm to predict user contexts. Claims 3, 12 and 21 are being amended herein to set forth a that an inductive learning algorithm is supervised. Chundi appears to disclose a data mining mechanism and it seems they mean a clustering algorithm plus a preprocessing mechanism which is not a supervised learning technique because they do not specify how the labeling (the supervision) is computed. This is a difference. In the present invention, the system tracks which resources are chosen by the users and uses this to drive training of an adaptive indexer. Chundi seems to be using clustering to learn these context, but is not learning from positive and negative examples of retrieval. Thus, for example, the present invention will "learn" that a query 'DNS settings' should not retrieve the 'Microsoft networking guide.' because no users ever select that resource given that query. Thus, in response to the rejection of the Claims 3, 12 and 21 as being anticipated by Chundi, while it appears that Chundi teaches a resource indexing and lookup system (limited to resources which are documents) which receives user queries, and maps queries to resources (it learns over time from previous queries and selections by mining usage "logs"), it is respectfully submitted that this is different than doing supervised learning as in the present invention, i.e., performs resource search in response to the query and generates a relevant response set that includes a sub-set of available resources.

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

With respect to the rejection of Claims 4, 13 and 22, these claims (as amended) assert that the user context classifier mechanism updates the context attribute value functions database with more enhanced functions. While Chundi's system appears to learn over time in terms of being able to better identify (enhance) query contexts, it is not a supervised learning in the sense of the present invention and does not focus on user context and user context attributes and user context attribute values. Chundi cannot learn about specific users since they do not maintain user identity in their logs and have no user database as we do (See Figure 1 element 11 labeled external user data of present specification). As Chundi does not use supervised learning, users cannot specify which contexts they are in, so Chundi must only use unsupervised clustering of query logs. Thus, Chundi contexts are more limited than the present invention as described herein.

With respect to the rejection of Claims 5, 14 and 23 which assert the user interaction records database which includes associated user contexts, applicants amend each of these claims to set forth that user context attribute values map to user context attribute functions, and further that data from the user records database serves as a training set for supervised learning to enable continuous improvement of functions in the user attribute function database. Claim 5 is being further amended to correct an antecedent problem for the phase "mechanism for updating...".

With specific regard to the rejection, Chundi's usage logs, while they contain historical user interaction data in terms of the user query, the documents returned and those opened by the user have no user contexts because, as mentioned previously herein, Chundi has no notion of user context in his invention. Chundi's definition of usage logs (See Chundi at col. 4, lines 24-32) states that ". . , information recorded in the logs depends on the

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

functionality of the system and what user and/or system actions are logged, or recorded, in the logs. For a text retrieval system, logs may contain, for each user query, the query itself, the number of documents from the collection that satisfy the query, the documents opened by the user, any feedback information on the relevance of the query, or other similar information." However, as mentioned, it would not have been obvious to extend Chundi to include associated user contexts in the usage logs because, as described herein, Chundi is not in a position to even represent user specific properties and, is further not in a position to obtain user identification information, and does not provide any user understandable representation of context (as in the graphical depiction of context function values provided in the present invention). That is, Chundi has no way to display their contexts since their contexts are simply a cluster of user queries. Contexts in the present invention can be created by an administrator, or can be labeled with graphic icons later by the administrator. This step is necessary in order to allow them to be displayable (settable) by the user.

With respect to the rejection of Claims 6, 15 and 24 as being allegedly unpatentable over Chundi, these claims assert that the user interaction data includes user validated contexts that were applicable during prior uses of system. To further clarify, each of these claims are being amended herein to set forth the phrase "user validated user contexts". As mentioned herein with respect to the rejection of Claim 5, Chundi does not teach user contexts at all and for reasons aforementioned, these claims would not be rendered obvious in view of Chundi.

With respect to the rejection of Claims 7 and 16, these claims further limit prior respective Claims 6 and 15 to introduce the notion that the interaction data includes prior transactions of similar users. Chundi does not focus on classifying users, only queries and

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

documents, so Chundi has no notion of similar users. However, there appears an implication in Chundi about similar users' common behaviors (Chundi at col. 4, lines 39-52). Chundi further hints at a notion of similar users and, at best, implies that his contexts reveal the intentions of the user but does not identify user contexts explicitly in the sense of the current invention as claimed in the present invention. For example, while Chundi states at Col. 8, lines 21-24:

> "Finally, the most important advantage of the log relationship is that it tries to capture the user's intent and vocabulary by analyzing his/her behavior through the logs."

to the extent that the user's intent is all about content, this is similar to the present invention. However, because the system of the present invention provides a rich user context vector at query entry time, and because the system of the present invention captures that rich user context data in interaction records, the present invention can identify resources that are more or less useful to the user based upon criteria beyond content, (such as cost, length of time, currency, popularity of resource to others, ability to access the resource from many user environments, etc). This difference is especially important, and novel, and provides value, where resources are not a homogenous set of documents, but a mixed set of differing products or differing formats. In sum, Chundi has no explicit notion of similar users nor an context attribute value functions database as in Claim 5 (Claim 14) from which Claim 7 (Claim 16) indirectly depends and refers to in terms of updating said functions.

With respect to the rejection of Claims 8 and 17, these claims further define what is meant by "similar users", e.g., shared organization, community, or environmental characteristics. Just to restate prior arguments herein, while Chundi appears to discuss

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

common behaviors it focuses on query context, not user context. Chundi provides no notion of the types of user context information included in the present specification as described at page 10, lines 22-26), to wit:

> ... the term "context" includes a very broad range of "attribute-value pairs" which describe a user, including, but not limited to, their knowledge of a customer service domain, their organizational and community contexts, their user environments (including technology capabilities) and other items of static, historical or transient nature.

With respect to the rejection of Claims 9 and 18, these claims assert that the mechanism for updating attribute value functions database results in increasing ability to predict derived contexts as functions of raw contexts. The present invention particularly defines raw contexts (at page 12, line 24 - page 13, line 6) as follows:

> In the third operation 243, a Context Applier process 29b is executed on-line when the 25 user initiates (logs-in) or refines a query to the system. Each user's current inquiry transaction has it's own set of raw contexts (as entered via the iconic interface or sensed in response to the user log-in identification). As shown in Figure 6, these raw contexts include user context whether it be static, historical, or transient, organizational or community context, environment context, or any other context associated with the user and dependent upon that user's interaction state and query domain, e.g., education, real estate, travel, etc. The Context Attribute functions 16 are used to compute a specific value for each context pair, given the raw context 250 for this particular user transaction. Since the functions are constantly improving, the values computed for each context 5 attribute for each individual user lead to improved accuracy and relevance in the search that follows.

Derived contexts are particularly defined at page 10, lines 9-26 as follows:

> Particularly, the Classifying User Contexts sub-process 24, receives as input the user 10 query and the raw context vector 25 and External User Data 11, and processes these against the User Interaction records 19 for this user/user group, data from the Context Attributes Master 14 and Attribute Value Functions 16. The system classifies this specified user interaction state and

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

> annotates the context vector 25' with a complete set of context parameters for use in subsequent processing. The Classifying User Contexts 15 sub-process 24 particularly applies an inductive learning algorithm as an attempt to predict derived contexts. Additionally, the Classifying User Contexts sub-process 24 updates the Attribute Value Functions database 16 with more enhanced functions.
>
> Figure 6 illustrates the specific control flow of the Classifying User Contexts sub-process 20 24 according to the present invention, and particularly, the methodology implemented for classifying a specified user interaction state and annotating it with a complete set of context parameters for use in the ensuing search processes. According to the invention, the term "context" includes a very broad range of "attribute - value pairs" which describe a user, including, but not limited to, their knowledge of a customer service domain, their 25 organizational and community contexts, their user environments (including technology capabilities) and other items of static, historical or transient nature.

Notwithstanding the fact that Chundi has no notion of user context, it would not have been obvious from Chundi to get the present method of predicting derived contexts as functions of the raw contexts as set forth in Claims 9 and 18 because, as described, contexts in the present invention depend on user-centric data, and can be learned by supervised induction. Additionally the present invention does not use documents associated by keyword to contexts as described in Chundi. Instead in the present invention there is performed an a priori mapping from queries to documents. This mapping is updated (learned) by observing which documents are retrieved by the users on previous retrievals. This means that according to the invention, the eventual mapping from queries and query contexts will be an induced function, not a heuristic combination as described in Chundi at col. 7, lines 35-65.

In view of the foregoing, the Examiner is additionally requested to withdraw the rejections of remaining Claims 2-9, 11-18 and 20-24 under 35 U.S.C. §103(a) as being

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

unpatentable over Chundi, and in view of their dependency upon respective amended independent Claims 1, 10 and 19.

With respect to the prior art made of record in this case but not applied by the Examiner, applicants' respectfully submit that:

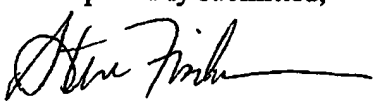
Anwar's invention (U.S. Patent No. 6,490,577) differs from the current invention in that Anwar focuses on analyzing user query behavior to identify clusters of records, such as those pertaining to sports, entertainment, etc. rather than discovering clusters of users (single mom with kids, business traveler, etc.) for the purpose of presenting them to the user for selection and refinement to better inform the current query via context selection and context vector population. Anwar does attempt to learn user selection patterns and to present record cluster names to the user to resolve query ambiguities. While Anwar's system is adaptive in that in learns from other users over time, it does not explicity identify or use user context in the manner of the current invention. It's main focus is on using the analysis of user activity to improve the ranking of records selected on the basis of the query alone.

Furthermore, Sarkar's invention (U.S. Patent No. 6,012,067), while it uses functions and values in a multi-step query process to enable query execution and comparison of found objects (resources), it does not focus at all on user context as informing a query, focusing solely on making visible the characteristics of the objects of the search regardless of their physical location and specific database structure on the web. Sarkar's invention, unlike the current invention, also does not analyze the results of prior user queries to identify new user contexts to use them to present to users explicitly and to enhance a query via a fully populated context vector for improved resource selection.

Received from < 5167424366 > at 5/20/03 4:51:26 PM [Eastern Daylight Time]

In view of the foregoing remarks herein, it is respectfully submitted that this application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance be issued. If the Examiner believes that a telephone conference with the Applicants' attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned.

Respectfully submitted,



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